

Research

Epigenetic Regulation of Metabolic Homeostasis

Obesity and its related diseases such as diabetes increasingly are responsible for significant economic and social burdens in established and emerging countries. For instance, diabetes alone, is affecting more than 170 million people worldwide. As such, understanding the molecular mechanism that controls adipose (fat) cell differentiation would greatly enhance our ability to solve these problems. Adipogenesis is a complex physiological process that requires concerted regulation of gene expression by various adipogenic factors. Among these regulators are many histone modifying enzymes and chromatin remodelers, suggesting that epigenetic mechanisms play essential roles in modulating adipogenesis. In addition to histone modifications, microRNA represents another major group of epigenetic regulators involved in diverse physiological processes including adipogenesis. Our current research centers on the function of histone modifications and microRNAs in white adipocyte differentiation. And we are extending our research to the epigenetic control of brown adipocyte differentiation as well as lineage commitment from multipotent stem cells. To fully decipher the epigenetic mechanisms controlling adipogenesis and lineage commitment, we utilize the advanced genomic and proteomic methodologies as well as classic biochemistry and molecular biology techniques in our studies. Besides our basic research into the molecular mechanism of adipogenesis, we are also interested in identifying novel drug targets to treat obesity and metabolic diseases such as diabetes.